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## 202201UECM3473OE5a

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## Review of preview

<b>Started on</b>	Tuesday, 12 April 2022, 09:52 AM
<b>Completed on</b>	Tuesday, 12 April 2022, 09:53 AM
<b>Time taken</b>	12 secs
<b>Grade</b>	0 out of a maximum of 10 (0%)

1

Marks: 1

Past data on two group policyholders are available and are given in the following table. Determine the estimated total credibility premium to be charged to the first group in year 4.

	Policyholder	Year 1	Year 2	Year 3	Year 4
Total Claims	1	-	11550	12400	-
No. in Group		-	90	100	150
Total Claims	2	20750	25700	22750	-
No. in Group		90	120	180	-

Answer:

✗

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Incorrect

Correct answer: 23572.5

Marks for this submission: 0/1.

2

Marks: 1

An insurance company has for five years insured three different types of risk. The number of policies in the  $j^{\text{th}}$  year for the  $i^{\text{th}}$  type of risk is denoted by  $m_{ij}$  for  $i = 1, 2, 3$  and  $j = 1, 2, 3, 4, 5$ . The average claim size per policy over all five years for the  $i^{\text{th}}$  type of risk is denoted by  $\bar{X}_i$ . The values of  $m_{ij}$  and  $\bar{X}_i$  are tabulated below.

	Number of policies					Mean claim size
Risk type $i$	Year 1	Year 2	Year 3	Year 4	Year 5	$\bar{X}_i$
1	19	24	25	26	42	870.0
2	43	51	61	59	43	704.0
3	45	40	71	92	110	931.0

The insurance company will be insuring 30 policies of type 1 next year and has calculated the aggregate expected claims to be 25961.74 using the assumptions of Empirical Bayes method. Calculate the expected annual claims next year for risks 2 assuming the number of policies will

be 49. \_\_\_\_\_

Answer:

**X**

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Incorrect

Correct answer: 35142.359

Marks for this submission: 0/1.

**3**

Marks: 1

For four group policyholders, the number of exposures in each group for years 1 and 2 are:

	Year 1	Year 2
I	48	65
II	36	49
III	-	17
IV	-	6

Empirical Bayes non-parametric methods are used to assign credibility. You are given:

$$\sum_{i,j} m_{ij}(x_{ij} - \bar{x}_i)^2 = 13,000$$

$$\sum_i m_i(\bar{x}_i - \bar{x})^2 = 60,000$$

Determine the credibility assigned to group 1. \_\_\_\_\_

Answer:

**X**

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Incorrect

Correct answer: 0.8451

Marks for this submission: 0/1.

**4**

Marks: 1

Group 1 and 2 have each been observed for 4 years. Group 3 has been observed for 2 years. Each of these groups had  $m_{ij}$  members in year  $j$  and average losses of  $x_{ij}$  per member, where  $i$  is the group number. Summary statistics are

$$\sum_j m_{ij}$$

$$= 300, i = 1$$

$$= 800, i = 2$$

$$= 200, i = 3$$

$$\sum_j m_{ij} x_{ij}$$

$$= 129,999, i = 1$$

$$= 240,000, i = 2$$

$$= 300,000, i = 3$$

$$\sum_j m_{ij} x_{ij}^2$$

$$= 76,499,133, i = 1$$

$$= 76,800,000, i = 2$$

$$= 562,666,667, i = 3$$

Using empirical Bayes nonparametric estimation, determine the credibility factor for Group 1.

\_\_\_\_\_

Answer:

**X**

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Incorrect  
Correct answer: 0.8068  
Marks for this submission: 0/1.

5

Marks: 1

You are given the following experience for two insured groups:

Group		Year			
		1	2	3	Total
1	Number of members	8	10	7	25
	Average loss per member	92	94	99	94.76
2	Number of members	30	30	23	83
	Average loss per member	121	111	132	120.43
Total	Number of members				108
	Average loss per member				114.49

Determine the nonparametric Empirical Bayes credibility premium for group 1, using the method that preserves total losses. \_\_\_\_\_

Answer:

X

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Incorrect  
Correct answer: 97.07687  
Marks for this submission: 0/1.

6

Marks: 1

Three individual policyholders have the following claim amounts over four years:

Policyholder	Year 1	Year 2	Year 3	Year 4
X	110	125	160	150
Y	230	250	280	150
Z	340	375	280	300

Using the nonparametric empirical Bayes procedure, estimate the pure premium for the coming year for Policyholder Y. \_\_\_\_\_

Answer:

X

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Incorrect  
Correct answer: 227.59  
Marks for this submission: 0/1.

7

Marks: 1

An insurer has data on losses for four policyholders for seven years.  $X_{ij}$  is the loss from the  $i$ th policyholder for year  $j$ . You are given:

$$\sum_{i=1}^6 \sum_{j=1}^8 (X_{ij} - \bar{X}_i)^2 = 34.6; \sum_{i=1}^6 (\bar{X}_i - \bar{X})^2 = 3.9$$

Calculate the Buhlmann credibility factor for an individual policyholder using nonparametric empirical Bayes estimation. \_\_\_\_\_

Answer:

X

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Incorrect  
Correct answer: 0.867979  
Marks for this submission: 0/1.

8

Marks: 1

The table below shows the annual aggregate claim statistics for three individual policyholders over four years. The annual aggregate claim for risk  $i$ , in year  $j$ , is denoted by  $x_{ij}$ .

Policyholder	$\bar{x}_i = 1/4 \sum_{j=1}^4 x_{ij}$	$s_i^2 = 1/3 \sum_{j=1}^4 (x_{ij} - \bar{x}_i)^2$
X	1,246	178,623
Y	2,304	128,456
Z	3,872	114,092

Using the nonparametric empirical Bayes procedure, Calculate the value of the credibility factor.

Answer:

X

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Incorrect  
Correct answer: 0.97989  
Marks for this submission: 0/1.

9

Marks: 1

For a group policyholder, we have the following data available:

	Year 1	Year 2	Year 3
Total Claims	4000	6000	-
No. in Group	10	15	20

If the manual rate per person is 387 per year, estimate the total credibility premium for year 3 using the nonparametric method. \_\_\_\_\_

Answer:

X

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Incorrect  
Correct answer: 8000  
Marks for this submission: 0/1.

10

Marks: 1

The following data are available for a group policyholder:

.	Year 1	Year 2	Year 3
Total claims	25450	30650	--
Number in groups	90	105	130

The manual rate per exposure is 490 per year. Estimate the total credibility premium for year 3 using empirical Bayes non-parametric methods. \_\_\_\_\_

Answer:

X

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Incorrect  
Correct answer: 37413.302955

Marks for this submission: 0/1.



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